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USSR, Ministry of Power Station Construction Leningrad Metal Works, Moscow 1962

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The Leningrad Metal Works is the largest power machine building enterprise in the Soviet Union.

It was founded in 1857, and produced household articles, telegraph wire, devices for heating and ventilation, cranes, steel structures for highways and railway bridges, floating docks, dredgers, stationary and ship boilers. In 1907 the plant manufactured the first steam turbine with a capacity of 200 kW.

After the Great October Socialist Revolution, in accordance with Lenin's plan for the electrification of Russia, known as GOELRO, the plant started a large scale production of turbines.

It manufactured steam turbines working on condensed steam and turbines with industrial and heating steam extraction for the live steam conditions of 29 atm, 400° C.

In 1938 the plant produced the first 100,000 kW, 3,000 r.p.m. tandem-compound turbine which was a great event in world engineering.

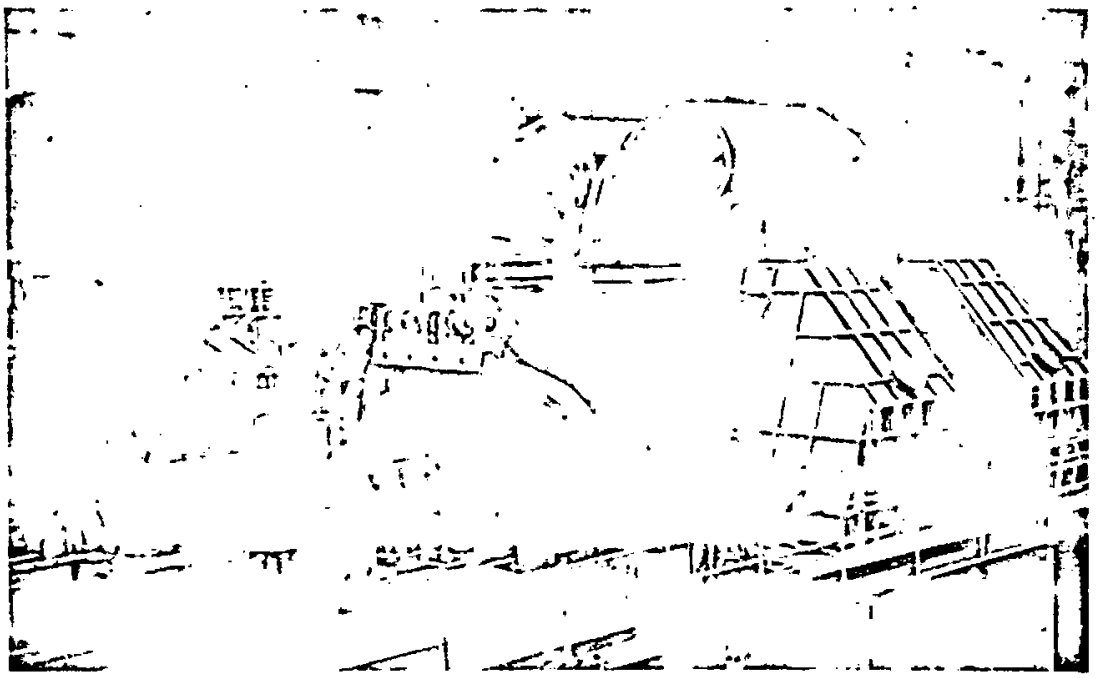
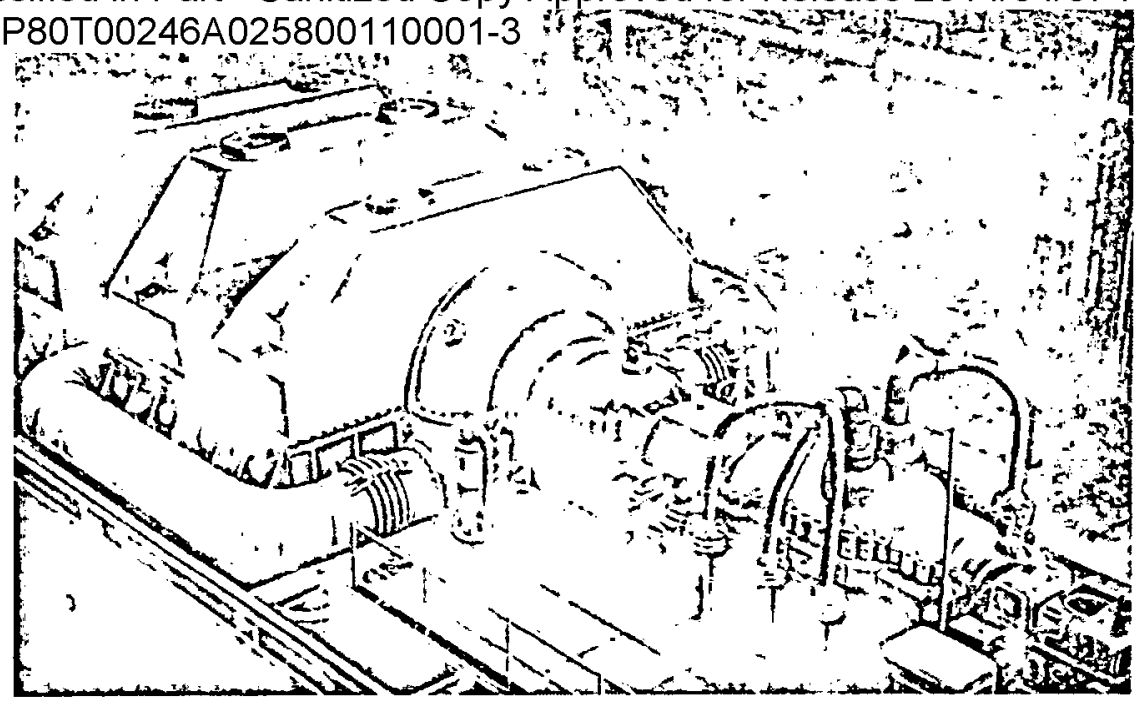
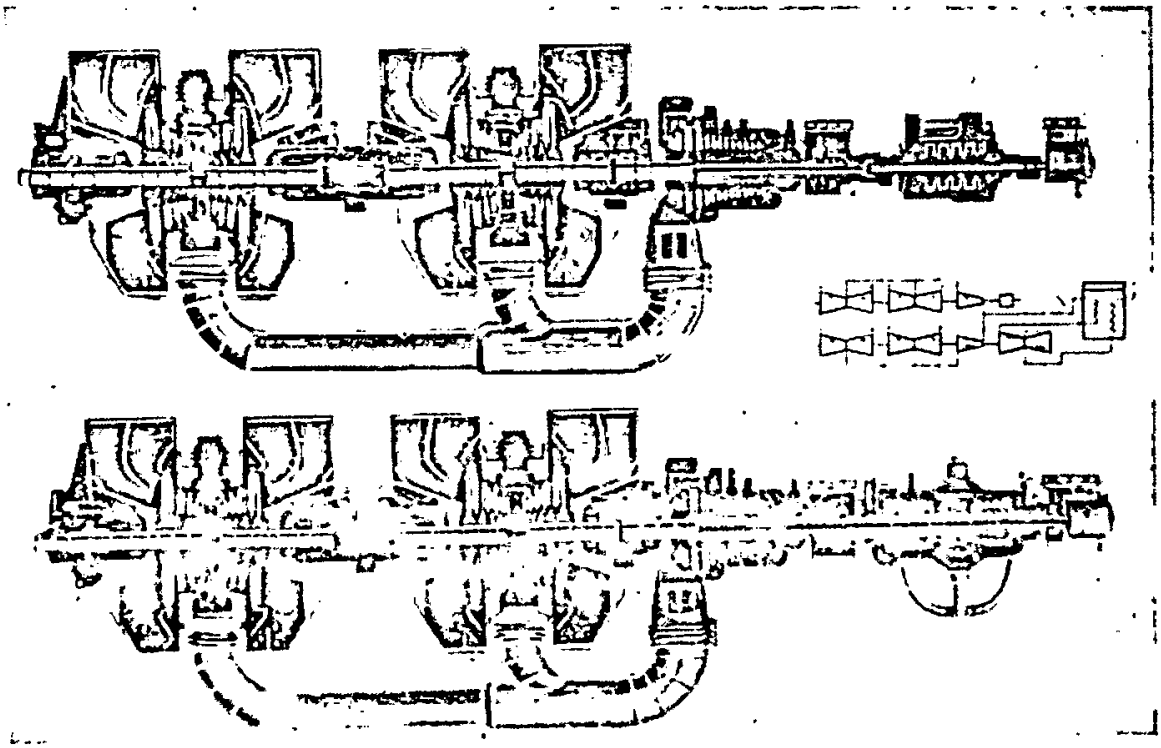


Fig 1 200,000 kW steam turbine of ПВК-200 type.



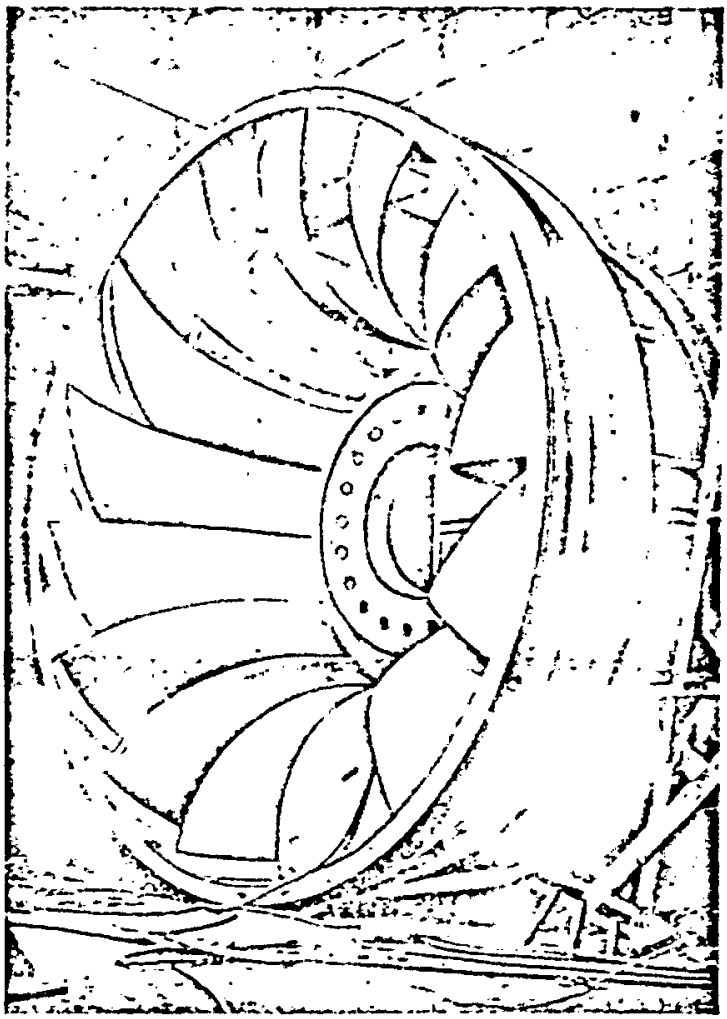
300,000 kW steam turbine of K-300-240 type.



800,000 kW cross-compound steam turbine (longitudinal section).

e plant produced a series of turbines for high steam conditions (90 atm, 500° C) with a capacity of 25,000, 50,000 and 100,000 kW including turbines working on condensed steam and turbines with regulating steam extraction.

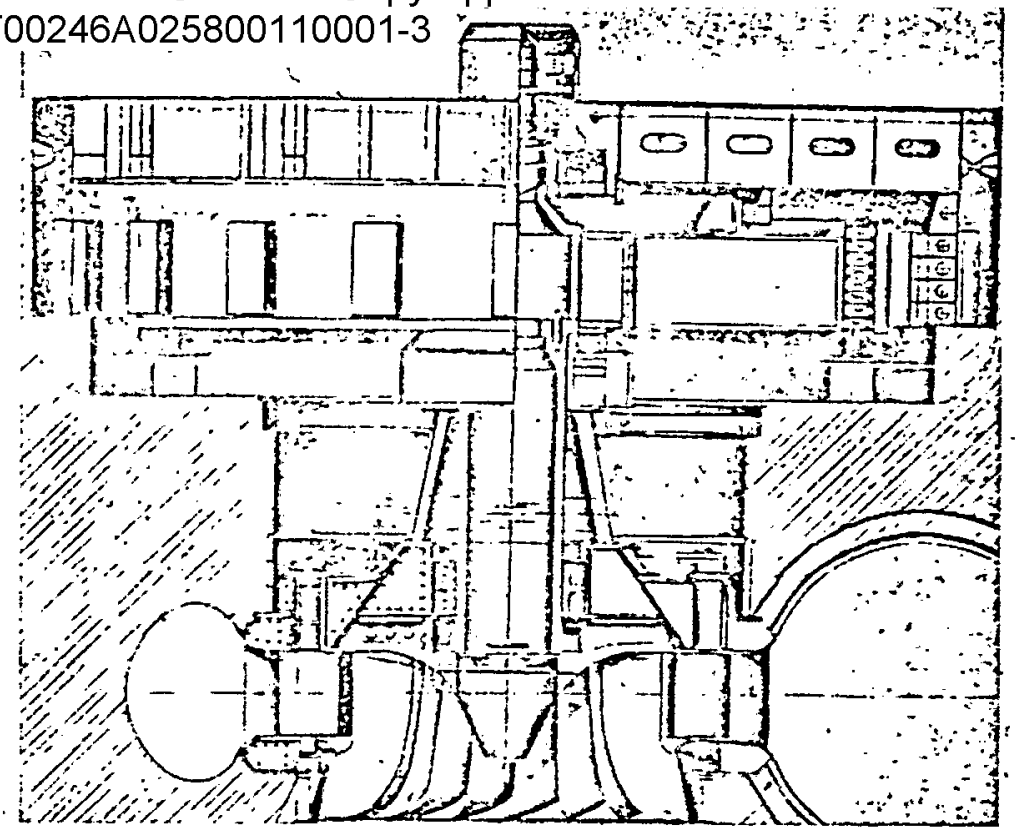
In 1952 for the first time in Europe the plant manufactured a steam turbine of 150,000 kW with steam conditions of 170 atm,



Welded runner of 230,000 kW hydraulic turbine installed at Bratsk hydro-electric station.

550—580° C and reheat up to 520—535° C. In 1958 the plant produced a steam turbine with a capacity of 200,000 kW for 130 atm, 565° C and reheat up to 565° C which won the Grand Prix at the World Exhibition in Brussels.

In 1960 the plant manufactured a tandem-compound steam turbine of 300,000 kW with the live steam conditions of 240 atm, 580° C and reheat up to 565° C. According to the Plan of the development of national economy for 1959—1965 the plant will produce turbines with a capacity of 800,000 kW during this seven-year period.



508,000 kW hydraulic turbine designed for Krasnoyarsk hydro-electric station (longitudinal section).

In 1955 the Leningrad Metal Works produced the first gas turbine unit in the Soviet Union with an output of 12,000 kW designed to work on gas obtained from underground coal gasification. Later it produced a gas turbine unit with a capacity of 25,000 kW.

At present the engineers of the plant are designing gas turbines of 100,000 kW.

The plant was the first enterprise in the Soviet Union that began to manufacture hydraulic turbines. In 1924 the first hydraulic turbine with a capacity of 370 kW was produced. By 1939 the plant built the world's largest hydraulic turbines of 55,000 kW each for the Uglich hydro-electric station.

After 1945 the plant designed and manufactured Francis turbines with a capacity of 72,000 kW each for the Dnieper hydro-electric station which was at that time under reconstruction.

Now the plant produces various types of hydraulic turbines.

For example, it has manufactured 20 Kaplan turbines with a capacity of 126,000 kW each for the V. I. Lenin hydro-electric station on the Volga river. This turbine also won the Grand Prix at the World Exhibition in Brussels. Hydraulic turbines of the same type were built for the Volgograd hydro-electric station, named after the XXII Congress of the C.P.S.U.

In 1969 the first superpowerful Francis hydraulic turbine of 230,000 kW was built for the Bratsk hydro-electric station. The design of 508,000 kW hydraulic turbines, to be installed at Krasnoyarsk hydro-electric station, the largest in the world, has been completed and in coming years the plant will start their manufacture. The plant is designing the first horizontal-shaft hydraulic turbine in the Soviet Union. A Kaplan turbine with double-bladed runner, which is unknown yet in the world's practice of building hydraulic turbines, has been designed and manufactured at this plant.

The plant exports its production to many countries of the world.

The Leningrad Metal Works is equipped with modern machines that made it possible to mechanize manual labour consuming operations, apply high regimes for cutting metal, reduce time on auxiliary operations, due to the automatic control and application of mechanized clamping devices. The unique specialized machines used at the plant are made in the Soviet Union and are the only ones in the world used in the practice of building hydraulic turbines.

In the current seven-year period the steam turbine shops of the works will also be equipped with a big number of specialized machines.

The laboratories of the plant in close cooperation with many scientific research institutes solve complicated theoretical problems directed to increase capacity and economical properties of the turbines produced, perform research work in the field of metallography, metallurgy, technology of production, find out the ways for improving durability, aerodynamical properties of the turbines.

The scientific and technical board is the centre which co-ordinates the scientific activity of the plant. Its members are the workers and engineers of the plant as well as the prominent Soviet scientists.